

RESEARCH ARTICLE

A field report on the Rotifer fauna of Mehao Wildlife Sanctuary, Arunachal Pradesh, India

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Doi: <https://doi.org/10.5281/zenodo.14800494>**Abstract**

Analysis of samples from the aquatic habitats of Mehao Wildlife Sanctuary in Arunachal Pradesh revealed that the freshwater rotifer diversity of the Sanctuary comprises of 9 species belonging to 5 genera, 4 families and 2 orders. Out of the 9 species, one species, *Asplanchna brightwelli* is a new record to the state and three species (*Brachionus bidentatus*, *B. diversicornis* and *Keratella tropica*) are confirmatory reports from the state. The need of extensive sampling from different aquatic habitats of the sanctuary particularly the mid and high elevation areas and their detailed analysis is necessary to unearth the actual Rotifer diversity of the Sanctuary.

Keywords: Rotifera; Eastern Himalaya; Arunachal Pradesh; Protected Areas; Mehao Wildlife Sanctuary

1. Introduction

The easternmost state of India, Arunachal Pradesh, is bestowed with a rich diversity of biota by virtue of its location in the Eastern Himalaya biodiversity hotspot. The state accounts for only 2.5% of the total geographic area of the country but sustains more than 6% of the total fauna occurring in India (Sinha, 2024a). To protect and conserve this rich biodiversity heritage, the state has created a network of 13 protected areas (Pas) comprising of 2 National Parks, 9 Wildlife Sanctuaries, 1 Orchid Sanctuary and 1 Biosphere Reserve, representing unique habitats and ecosystems. The cumulative area of these PAs accounts for more than 12% of the geographic area of the state, one of the highest in the country in terms of ratio of Protected Area to geographic area (Sinha, 2024b). Mehao Wildlife Sanctuary (MWS) with an area of 281.5 sq. km is one of the PAs in the lower Dibang basin which was established vide notification no. FOR.85/77 dated 15/12/1980. Except for some scattered reports on the higher vertebrates like mammals and birds, not much is known about the faunal biodiversity of this sanctuary (Sinha, 2024b).

Rotifera are a group of pseudocoelomate, mostly microscopic, planktonic organisms primarily inhabiting the mainly littoral zone of freshwater ecosystems. They are omnipresent, occurring in different types lotic as well as lentic freshwater habitats ranging from tropical to Alpine conditions (Segers, 2008). Though microscopic in size, rotifers play an important role in the trophic dynamics of mainly freshwater ecosystems for their high population density, occurring up to 1000 individuals per litre and high turn-over rates (Wallace et al., 2006; Segers, 2008). Besides, rotifers are also good bio-indicators of aquatic bodies (Sharma and Sharma, 1999) and widely used in routine water-quality monitoring studies.

Out of a little over 2000 species of Rotifera known globally (Segers, 2007; Jersabek and Leitner, 2013), about 419 species of freshwater Rotifera are known from India (Sharma and Sharma, 2017). Despite the beginning of studies in Indian Rotifera more than 100 years ago (Anderson, 1889) and that of the North East India about 50 years ago (Patil, 1978), not much is known about the rotifer biodiversity of this Himalayan state of Arunachal Pradesh. Sinha (2018) reviewed the studies on Rotifera of Arunachal Pradesh and confirmed the presence of 45 species of Rotifera in the state. A subsequent report enlists the occurrence of 172 rotifer species in

the state (Sharma and Sharma, 2019) including 3 new records to India, 4 new records to NE India and 89 new records to Arunachal Pradesh. This has serious taxonomic implications as reporting new record to a state/region/country needs more than mere marking in a list. Sinha (2020) provided the taxonomic account of 50 species of Rotifera from the lower elevation areas of Arunachal Pradesh. Recently, 18 species of rotifer have been recorded from Tale Wildlife Sanctuary (Sinha, 2024c) and 21 species of rotifer from the Dihang-Dibang Biosphere Reserve (Sinha, 2024d) of the state. Whatever may be the exact numbers of Rotifera known from the state, virtually there is no information on the rotifer fauna from the MWS. There is only one report on the occurrence of the rotifer genera *Lecane*, *Keratella*, *Brachionus* and *Rotatoria* from the Mehao lake of MWS (Sarma et al., 2017). However, there is no report of occurrence of any rotifer at the species level from the sanctuary. The present study is the first report on the rotifer fauna from MWS.

2. Materials and methods**2.1. Study area**

Mehao Wildlife Sanctuary (MWS) or the erstwhile Mehao Forest Reserve was notified in the Sixth Plan vide notification no. FOR.85/77 dated 15/12/1980 with an area of 281.5 sq. km in the lower Dibang basin. It lies approximately between latitudes of 28.08' - 28.25' N & longitude of 93.5' - 95.75' E, with an altitude range from of 200 - 3,560 m a.s.l (Sinha, 1984). The Sanctuary is named after the about 4 sq. km large Mehao Lake (28.1497 N, 95.9433 E, 1640 m) which is believed to be an accidental lake created during the earthquake of 1950. The Sanctuary is located around the valley of the Dri river which flows almost due south from the extreme north-eastern corner of India to join the confluence of the Dibang and Lohit rivers at 27.9167°N, 95.6667°E. Topographically, the sanctuary comprises of mountains, hills, rivers and lakes. As the Sanctuary is located on the windward side of the Eastern Himalayas so it receives heavy rainfall both from the southwest and the northeast monsoons. It rains nearly half of the year. The climate is humid tropical to temperate climate, with an average annual rainfall of 4,189 mm, most of which occurs during May-September. The Sanctuary forms a major part of the catchment area of the Brahmaputra River. The wetlands of the

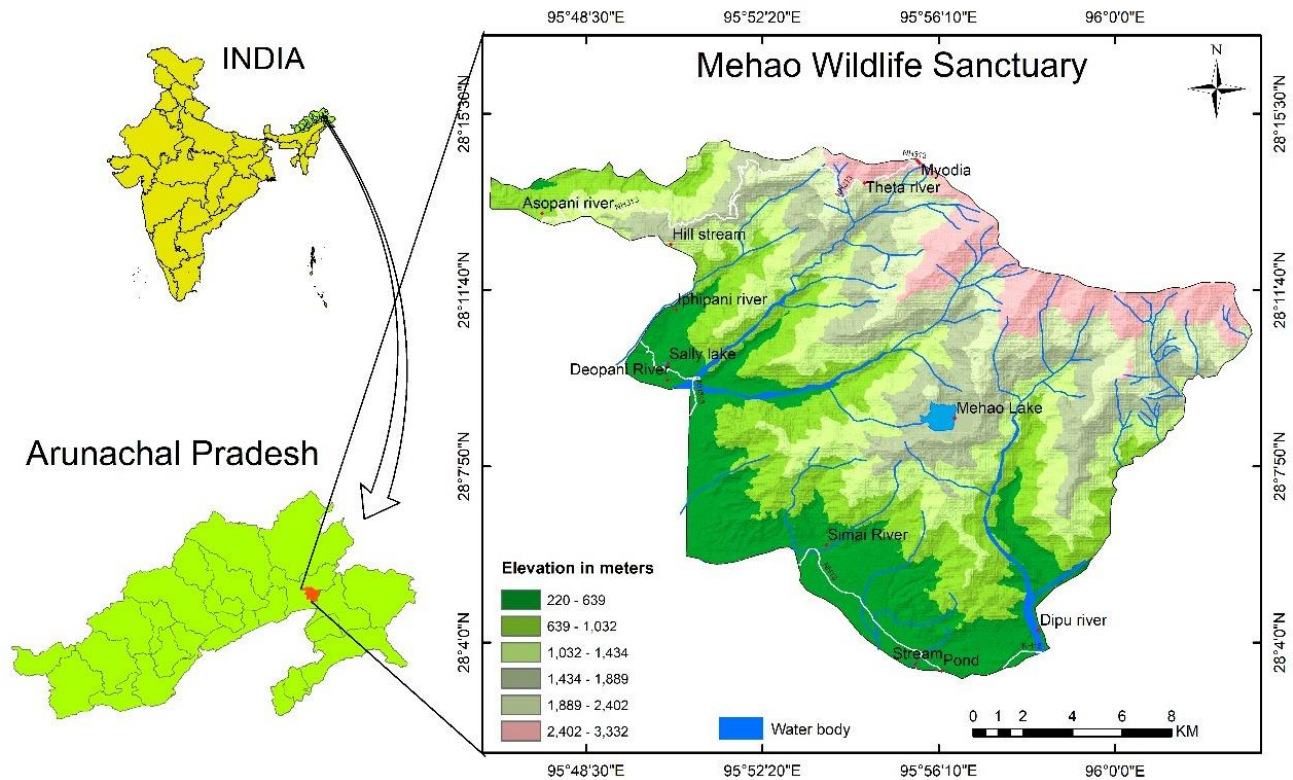


Figure 1. Map of Mehao Wildlife Sanctuary, Arunachal Pradesh, India showing sampling sites.

Sanctuary comprise of major perennial fast flowing rivers like Deopani, Asopani, Ihipani, Ithun, Eje, Diphu and Jawe fed by a number of seasonal streams and streamlets. Besides, a couple of lakes like Sally lake (~ 2 ha) very near the Roing township and Mehao lake adds to the water resources of the Sanctuary.

2.2. Sampling collection, processing and identification

Plankton sampling was done with a 50 μ m mesh size Nylobolt plankton net from different aquatic habitats like rivers, streams and lentic bodies like lakes, ponds, pools etc. in and around Mehao Wildlife Sanctuary (Figure 1). In lotic systems sampling was done in areas where the water is stagnant or the flow of current is minimum. In lentic bodies, aquatic vegetation was disturbed, if present, to dislodge the attached biota before plankton sampling. Plankton samples were immediately preserved in 4–5% neutralised formalin. The samples were cleared of debris, if any, in the laboratory and preserved in freshly prepared 5% formalin.

All the plankton samples were screened under a stereoscopic binocular microscope (Leica M60) and Rotifera specimens were sorted with the help of a fine camel hair brush. Individual taxa were identified using Nikon Eclipse compound microscope equipped with NIS Elements-D software with the help of (Koste, 1978; Koste and Shiel, 1987, 1990; Shiel and Koste, 1992, 1993; Segers, 1995; Sharma, 1998; Sharma and Sharma, 1999, 2000; Kutikova, 2002; Jersabek and Leitner, 2013). Generalised literature consulted for collection, identification and preservation are Edmondson (1959); Michael (1973); Battish (1992); Shiel (1995); Fernando (2002). Identified species were stored in glass slides and deposited in the National Zoological Collection of Arunachal Pradesh Regional Centre of Zoological Survey of India at Itanagar. All measurements are in μ m.

3. Results and discussion

3.1. Systematic List

Phylum Rotifera
 Class: Eurotatoria De Ridder, 1957
 Subclass: Monogononta Plate, 1889
 Superorder: Gnesiotrocha Kutikova, 1970
 Order: Flosculariaceae Haring, 1913
 Family: Testudinellidae Haring, 1913
 Genus *Testudinella* Bory de St. Vincent, 1826
Testudinella patina (Hermann, 1783)

Superorder: Pseudotrocha Kutikova, 1970
 Order: Ploima Hudson and Gosse, 1886
 Family: Asplanchnidae Eckstein, 1883
 Genus *Asplanchna* Gosse, 1850
Asplanchna brightwelli Gosse, 1850

Family: Brachionidae Ehrenberg, 1838
 Genus *Brachionus* Pallas, 1766
Brachionus bidentatus Anderson, 1889
B. calyciflorus borgerti Apstein, 1907
B. diversicornis (Daday, 1883)
B. quadridentatus (Hermann, 1783)

Genus *Keratella* Bory de St. Vincent, 1822
Keratella tropica (Apstein, 1907)

Family: Trichocercidae Haring, 1913
 Genus *Trichocerca* Lamarck, 1801
Trichocerca cylindrica (Imhof, 1891)
T. elongata (Gosse, 1886)

3.2 Systematic Account

Phylum Rotifera
 Class: Eurotatoria De Ridder, 1957
 Subclass: Monogononta Plate, 1889
 Superorder: Gnesiotrocha Kutikova, 1970
 Order: Flosculariaceae Haring, 1913
 Family: Testudinellidae Haring, 1913
 Genus *Testudinella* Bory de St. Vincent, 1826
Testudinella patina (Hermann, 1783)
 (Figure 2)

1783. *Brachionus patina* Hermann, Naturforscher Halle, 19: p. 48, pl. 2, fig. 10.

Materials: 1 ex., Arunachal Pradesh, L. Dibang Valley, MWS, Mehao Lake, 28.1497 N, 95.94332 E, 1640 m, 23.x.2015, coll. SD Gurumayum & party, APRC-RF-0005; 1 ex., Arunachal Pradesh, L. Dibang Valley, MWS, Sally Lake, 28.1677 N, 95.8381 E, 467 m, 01.ix.2016, coll. SD Gurumayum & party, APRC-RF-0064.

Measurements: Lorica length: 171–182, Max. width: 159–170.

Distribution: INDIA: Arunachal Pradesh- Tawang (Barik et al., 2014), L. Dibang Valley (MWS) (present report); Andhra Pradesh, Assam, Bihar, Gujarat, J&K, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Tamil Nadu, Tripura, West Bengal (Sharma and Sharma, 2018); Elsewhere: Cosmopolitan, including Pacific region (Jersabek and Letner, 2013).

Superorder: Pseudotrocha Kutikova, 1970

Order: Ploima Hudson and Gosse, 1886

Family: Asplanchnidae Eckstein, 1883

Genus *Asplanchna* Gosse, 1850

Asplanchna brightwelli Gosse, 1850

(Figure 3)

1850. *Asplanchna brightwelli* Gosse, Ann. Mag. Nat. Hist. (ser. 2) 6: p. 23.

Materials: 2 exs., Arunachal Pradesh, L. Dibang Valley, MWS, Roing, Sally Lake, 28.1677 N, 95.8381 E, 467 m, 15.x.2015, coll. SD Gurumayum & party, APRC-RF-0053.

Measurements: Total length: 470-530, Trophi: 65-70.

Distribution: INDIA: Arunachal Pradesh - L. Dibang Valley (MWS (present report); Andhra Pradesh, Assam, Kashmir, Ladak, Meghalaya, Orissa, Punjab, West Bengal and Tripura (Sharma and Sharma, 1999, 2000). Elsewhere: (Jersabek and Letner, 2013)

Remarks: New state record for Arunachal Pradesh.

Family: Brachionidae Ehrenberg, 1838

Genus *Brachionus* Pallas, 1766

Brachionus bidentatus Anderson, 1889

(Figure 4)

1889. *Brachionus bidentata* Anderson, J. Asiatic Soc. Bengal, 58: p. 357, pl. 21, fig. 13.

Materials: 1 ex., Arunachal Pradesh, L. Dibang Valley, MWS, Roing, Sally Lake, 28.1677 N, 95.8381 E, 467 m, 15.x.2015, coll. SD Gurumayum & party, APRC-RF-0004.

Measurements: Lorica length: 196, Lorica width: 115.

Distribution: INDIA: Arunachal Pradesh- L. Dibang Valley (MWS) (present report); Andhra Pradesh, Assam, Manipur, Meghalaya, Mizoram, Haryana, Orissa, Punjab, Tripura, West Bengal (Sharma and Sharma, 2014). Elsewhere: Pantropical (Jersabek and Letner, 2013).

Remarks: Sharma and Sharma (2019) reported its occurrence in Arunachal Pradesh but did not specify the locality. This report confirms the occurrence of the species in the state.

Brachionus calyciflorus borgerti Apstein, 1907

(Figure 5)

1907. *Brachionus amphicerus borgerti* Apstein, Zool. Jahrb. Abt. Syst. Geog. Biol. Tiere, 25: p. 211, Figs. G, a-c.

Materials: 6 exs., Arunachal Pradesh, L. Dibang Valley, Roing-Anini Rd, Stream, 28.2063 N, 95.8164 E, 808 m, 16.iii.2014, coll. B. Sinha, APRC-RF-0085.

Measurements: Lorica length: 276-327, max. width: 182-216.

Distribution: INDIA: Arunachal Pradesh- L. Dibang Valley (MWS) (Sinha, 2024d); Tamil Nadu, West Bengal (Sharma and Sharma, 2014). Elsewhere: Tropical (Jersabek and Letner, 2013).

Brachionus diversicornis (Daday, 1883)

(Figure 6)

1883. *Schizocerca diversicomis* Daday, Math. Termesz Ertesito Budapest, 1: p. 291.

Materials: 7 exs., Arunachal Pradesh, L. Dibang Valley, MWS, Roing, Sally Lake, 28.1677 N, 95.8381 E, 467 m, 04.iv.2016, coll. SD Gurumayum, APRC-RF-0001; 3 exs., Arunachal Pradesh, L. Dibang Valley, MWS, Roing, Sally Lake, 28.1677 N, 95.8381 E, 467 m, 01.ix.2016, coll. SD Gurumayum, APRC-RF-0062; 5 exs., Arunachal Pradesh, L. Dibang Valley, MWS, Koronu, Pond, 28.0551 N, 95.9383 E, 267 m, 17.iii.2014, coll. B. Sinha, APRC-RF-0089.

Measurements: Lorica length: 229-282, lorica width: 114-171.

Distribution: INDIA: Arunachal Pradesh-L. Dibang Valley (MWS) (Sinha, 2024d); common in most part of India (Sharma and Sharma, 2014). Elsewhere: Cosmopolitan (Jersabek and Letner, 2013).

Remarks: Sharma and Sharma (2019) reported this species as new record from Arunachal Pradesh but did not mention the habitat and locality. This report confirms the occurrence of the species in the state.

Brachionus quadridentatus (Hermann, 1783)

(Figure 7)

1783. *Brachionus quadridentatus* Hermann, Naturforscher Halle, 19: p. 47, pl. 2, fig. 9.

Materials: 15 exs., Arunachal Pradesh, L. Dibang Valley, MWS, Roing, Sally Lake, 28.1677 N, 95.8381 E, 467 m, 04.iv.2016, coll. SD Gurumayum, APRC-RF-0003; 1 ex., Arunachal Pradesh, L. Dibang Valley, MWS, Roing, Sally Lake, 28.1677 N, 95.8381 E, 467 m, 01.ix.2016, coll. SD Gurumayum, APRC-RF-0063.

Measurements: Lorica length: 220-245, Max. lorica width: 100-130.

Distribution: INDIA: Arunachal Pradesh- L. Dibang Valley (MWS) (Sinha, 2024d), Tawang (Barik et al., 2014); common throughout India (Sharma and Sharma, 2014). Elsewhere: Cosmopolitan, including Antarctic and Pacific regions (Jersabek and Letner, 2013).

Genus *Keratella* Bory de St. Vincent, 1822

Keratella tropica (Apstein, 1907)

(Figure 8)

1907. *Anurea vulga* v. *tropica* Apstein, Zool. Jb. Abt. Syst., 25: p. 210, fig. F.a-c.

Materials: 1 ex., Arunachal Pradesh, L. Dibang Valley, Roing-Anini Rd, Stream, 28.2063 N, 95.8164 E, 808 m, 16.iii.2014, coll. B. Sinha, APRC-RF-0084.

Measurements: Lorica length: 114, Max. lorica width: 65.

Distribution: INDIA: Arunachal Pradesh- L. Dibang Valley (MWS) (Sinha, 2024d); recorded from almost all parts of India (Sharma and Sharma, 2014). Elsewhere: Cosmopolitan, including Pacific region (Jersabek and Letner, 2013).

Remarks: Sharma and Sharma (2019) reported this species from Arunachal Pradesh but did not mention habitat and locality details. This report confirms the occurrence of the species in the state.

Family: Trichocercidae Harring, 1913

Genus *Trichocerca* Lamarck, 1801

Trichocerca cylindrica (Imhof, 1891)

(Figure 9)

1891. *Mastigocerca cylindrica* Imhof. Zool. Anz., 14: p. 37.

Materials: 12 exs., Arunachal Pradesh, L. Dibang Valley, MWS, Roing, Sally Lake, 28.1677 N, 95.8381 E, 467 m, 04.iv.2016, coll. SD Gurumayum, APRC-RF-0002.

Measurements: Total length: 310-639, Left toe: 150-310, Right toe: 19-23.

Distribution: INDIA: Arunachal Pradesh-L. Dibang Valley (MWS) (present report), Tawang (Sharma et al., 2017); recorded from almost throughout India (Sharma and Sharma, 2017). Elsewhere: Cosmopolitan (Jersabek and Letner, 2013).

Remarks: New locality record from Arunachal Pradesh. Sharma and Sharma (2019) reported this species from Arunachal Pradesh but did not mention habitat and locality details.

Trichocerca elongata (Gosse, 1886)

(Figure 10)

1886. *Mastigocerca elongata* Gosse (In: Hudson and Gosse, 1886), p. 62, pl. 20, fig. 8.

Materials: 1 ex., Arunachal Pradesh, L. Dibang Valley, MWS, Mehao Lake, 28.1497 N, 95.94332 E, 1640 m, 23.x.2015, coll. SD Gurumayum & party, APRC-RF-0006.

Measurements: Body length: 467, Left toe: 227, Right toe: 45.

Distribution: Arunachal Pradesh-L. Dibang Valley (MWS) (present report), Tawang (Sharma et al., 2017); recorded from most part of India (Sharma and Sharma, 2017). Elsewhere: Cosmopolitan (Jersabek and Letner, 2013).

Remarks: New locality record from Arunachal Pradesh. Sharma and Sharma (2019) reported this species from Arunachal Pradesh but did not mention habitat and locality details.

4. Conclusion

A total of nine species of Rotifera including one new state record namely *Asplanchna brightwelli* have been recorded from the aquatic habitats of Mehao Wildlife Sanctuary. This study also provides the confirmatory report of *Brachionus bidentatus*, *B. diversicornis* and *Keratella tropica* from the Himalayan state.

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Author's contribution

The author is responsible for field survey, collection, preservation, identification of the specimens and drafting of the manuscript.

Conflict of Interest Declaration

There is no conflict of interest.



Figure 2. *Testudinella patina* (Hermann)

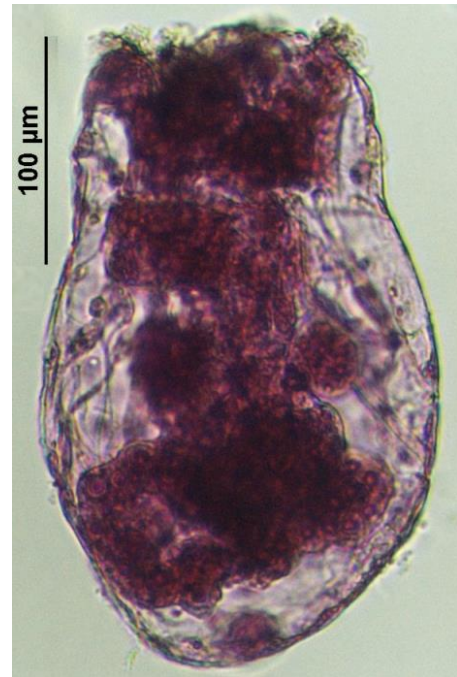


Figure 3. *Asplanchna brightwelli* Gosse



Figure 4. *Brachionus bidentatus* Anderson



Figure 5. *Brachionus calyciflorus borgerti* Apstein

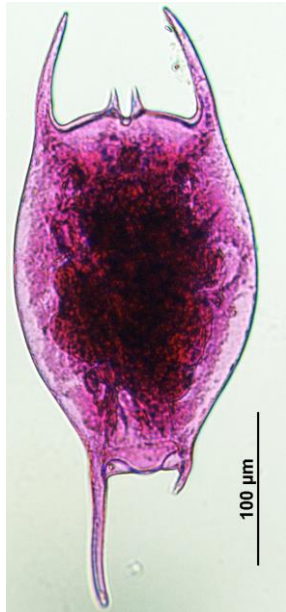


Figure 6. *Brachionus diversicornis* (Daday)

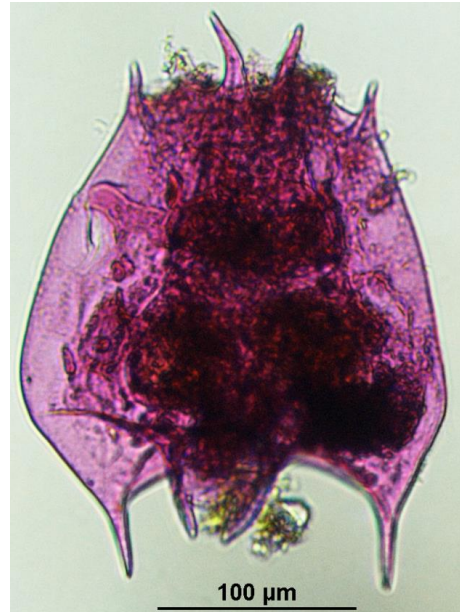


Figure 7. *Brachionus quadridentatus* (Hermann)



Figure 8. *Keratella tropica* (Apstein)



Figure 9. *Trichocerca elongata* (Gosse)



Figure 10. *Trichocerca cylindrica* (Imhof)

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